

We claim:

1. A process of preparing unsaturated fatty acids, which  
5 comprises introducing, into an organism, at least one  
isolated nucleic acid sequence encoding a polypeptide having  
 $\Delta 6$ -desaturase activity, selected from the group consisting  
of:
- 10 a) a nucleic acid sequence having the sequence shown in SEQ  
ID NO: 1,
- b) nucleic acid sequences which, as a result of the  
degeneracy of the genetic code, are derived from the  
15 [lacuna] in SEQ ID NO: 1,
- c) derivatives of the nucleic acid sequence shown in SEQ ID  
NO: 1 which encode polypeptides with the amino acid  
sequences shown in SEQ ID NO: 2 and have at least 50%  
20 homology at the amino acid level without substantially  
reducing the enzymatic action of the polypeptides,
- and culturing this organism, where the cultured organism  
contains at least 1 mol% of unsaturated fatty acids based on  
25 the total fatty acid content in the organism.
2. The process as claimed in claim 1, wherein the nucleic acid  
sequence is derived from a plant or algae.
- 30 3. The process as claimed in claim 1 or 2, wherein the nucleic  
acid sequence is derived from *Physcomitrella patens*.
4. The process as claimed in any of claims 1 to 3, wherein the  
organism is an organism selected from the group consisting of  
35 bacterium, fungus, ciliate, algae, cyanobacterium, animal or  
plant.
5. The process as claimed in any of claims 1 to 4, wherein the  
organism is a plant or algae.
- 40 6. The process as claimed in any of claims 1 to 5, wherein the  
organism is an oil crops [sic].
7. The process as claimed in any of claims 1 to 6, wherein the  
45 cultured organism contains at least 5% by weight of  
unsaturated fatty acids based on the total fatty acid content

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in the organism.

8. The process as claimed in any of claims 1 to 7, wherein the unsaturated fatty acids are isolated from the organism.

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9. A transgenic organism selected from the group consisting of plants, fungi, ciliates, algae, bacteria, cyanobacteria or animals comprising at least one isolated nucleic acid sequence encoding a polypeptide with  $\Delta 6$ -desaturase activity, selected from the group consisting of:

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- a) a nucleic acid sequence having the sequence shown in SEQ ID NO: 1,

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- b) nucleic acid sequences which, as a result of the degeneracy of the genetic code, are derived from the [lacuna] in SEQ ID NO: 1,

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- c) derivatives of the nucleic acid sequence shown in SEQ ID NO: 1 which encode polypeptides with the amino acid sequences shown in SEQ ID NO: 2 and have at least 50% homology at the amino acid level without substantially reducing the enzymatic action of the polypeptides.

- 25 10. A transgenic organism as claimed in claim 9, wherein the organism is a plant or algae.

11. An oil, lipid or fatty acid or a fraction thereof, prepared by the process as claimed in any of claims 1 to 8.

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12. The use of the oil, lipid or fatty acid composition as claimed in claim 11 or of a transgenic organism as claimed in claim 9 in feed, foodstuffs, cosmetics or pharmaceuticals.

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FOOTNOTES

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